IN THE CLAIMS

The listing of claims below will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) In a vehicle having axles having two opposite ends, wheels mounted to the axle ends, a tire in each wheel and a pressure control system installed in the vehicle, a rotary pneumatic coupling for connecting at least a respective one or more of said tires to said pressure control system to control the air pressure inside said tire, said rotary pneumatic coupling comprising

a block mounted to the wheel,

a pressurized air chamber is formed inside said block and which is linked to said tire(s),

a rotary shaft located inside said block and axially traversed by a conduit operatively connecting said chamber to said air pressure control system; and

a rotary seal mechanism arranged between said block and said rotary coupling shaft to avoid, under normal operating conditions, any leak of pressurized air from said chamber connected to the axial conduit,

wherein said coupling shaft end is provided with a device for connection to a pressurized air duct passing through said vehicle axle to connect said chamber, through said conduit, to said pressure control system, and

wherein said block is provided with a vent port selectively communicated to said chamber and said axial conduit, said communication being normally closed by said rotary seal mechanism.

2. (Original) A coupling according to claim 1, wherein said block is rotatably mounted on said coupling shaft by means of a pair of ball bearings.

3. (Original) A coupling according to claim 2, wherein said coupling shaft is prevented from shifting axially relative to said ball bearings by a washer housed in a circumpherential groove thereof and abutting against said ball bearings.

4. (Original) A coupling according to claim 2, extending no more than 30 mm from said wheel.

5. (Original) A coupling according to claim 1, wherein said communication between said vent port and said chamber and axial conduit opens in response to a predetermined axial shift of said coupling shaft.

6. (Original) A coupling according to claim 1, wherein said rotary seal mechanism comprises a seal plug housed in said block and sealing said chamber, said seal plug having a longitudinal opening and said coupling shaft having an end abutting against said plug such that said seal opening is substantially aligned with said axial conduit of the coupling shaft.

7. (Original) A coupling according to claim 6, wherein said seal is movable relative to said block in the axial direction of said shaft and is provided with a seal ring sealing it against said block.

8. (Original) A coupling according to claim 6, wherein said rotary seal mechanism is provided with a spring seated on said block and stressing said seal longitudinally towards said coupling shaft.

9. (Original) A coupling according to claim 1, wherein said block comprises at least two members screwed onto each other such that one of them is fixed to the wheel axle end and the other one is axially adjustable relative to the first member, said block also comprising a lock nut capable of securing the axial position of said block's adjustable member.

10. (Original) In combination with a vehicle having a non-rotary axle having a hollow inside, a sidewall surrounding the hollow inside and an axle end to which said wheel is mounted, a tire inflation pressure control system located in a non-rotary part of the vehicle and comprising a pressurized air source, pipe means for communicating said source with said tire, means for detecting air pressure in the pipe means and a valve means for selectively opening communication between said tire and the source in response to a signal from the pressure detecting means indicating an air pressure requirement;

wherein said pipe means comprises:

an external pipe extending from the control system to an intermediate point of said axle,

an internal tube laid along the hollow inside of the axle towards said axle end,

static coupler means located at said intermediate point of the axle for communicating said internal tube to said external pipe through said sidewall and

a rotary pneumatic coupling mounted to said axle end for communicating air between said second pipe means and said tire.

11. (Original) A control system according to claim 10, wherein said control system is located in a trailer of said motor vehicle, and said air pressure detecting means and said electrovalve of said system are housed in a control module including a panel provided with inflation status indicator lights, said control module being mounted on said trailer such that said panel is in the field of view of a driver's rear-view mirror.

12. (Original) A control system according to claim 11, wherein said indicator lights comprise for each axle a red light, a yellow light and a green light, the green light indicating that the tires maintain their adjustd pressure, the red light indicating low supply air pressure, the tires then being disconnected from the pressurized air supply until operating pressure is recovered, while the yellow light operates as a fault coder for the axle: intermittent flickering of the yellow light alone means a minor air leak in the tire, replenishable by the pressurized air supply; yellow light continuously on means a major air leak in the tire, replenishable for a short period by the pressurized air supply in order to repair the fault; and yellow light flickering alternately with the red light means an air leak in the tire exceeding any compensation by the pressurized air supply.

13. (Original) A control system according to claim 10, wherein said internal tube includes a connecting end projecting through said axle end and said rotary pneumatic coupling is connected to said internal tube by a flexible length of tubing plugged onto said projecting connecting end.

14. (Original) A control system according to claim 10, wherein said said rotary pneumatic coupling comprises:

a block mounted to the wheel,

a pressurized air chamber formed inside said block and linked to said tire, a rotary shaft located inside said block and axially traversed by a conduit operatively connecting said chamber to said air pressure control system; and

a rotary seal mechanism arranged between said block and said rotary coupling shaft to avoid, under normal operating conditions, any leak of pressurized air from said chamber connected to the axial conduit,

said coupling shaft end provided with a device for connection to a pressurized air duct passing through said vehicle axle to connect said chamber, through said conduit, to said pressure control system, and

said block provided with a vent port selectively communicated to said chamber and said axial conduit, said communication being normally closed by said rotary seal mechanism.

15. (Original) A method for arranging a pressurized air duct inside a vehicle's hollow half-axle for connecting a wheel tire on an end of said half-axle to a tire inflation pressure control system located in a non-rotary part of the vehicle, said method comprising the steps of:

drilling holes in the end of the axle and in an intermediate side point of the axle;

laying an air tube between both holes;

placing a connector in said intermediate hole and connecting it to an end of said tube; passing the other end of the tube through said hole drilled in the end of the axle and connecting it to the inner axle end of the rotary pneumatic coupling by screwing it into the first hole; and

connecting the pneumatic coupling system to said connector.

16. (Original) A method according to claim 15, wherein to lay said air tube inside the vehicle axle, an auxiliary tube is previously laid through said axle inside and said auxiliary tube is used as a guide for passing said air tube inside the vehicle axle.

17. (Original) A method according to claim 15, comprising the sep of forming a labyrinthine vent for an oil chamber housed in the axle end, extending it to said intermediate hole parallel to and outside of said conduit and said connector.

18. (Original) A method according to claim 15 for arranging an air duct inside a solid-end half-axle, comprising the steps of:

- drilling the axle end;

- performing cross drilling in the middle zone of the axle tube;
- making a first centred thread in the axle end;
- making a second thread in the middle zone of the axle tube;
- protecting a polyamide tube with an hexagonal polyamide tube in the solid portion of the axle;
- passing a through tube inside a straight copper pipe;
- passing a through tube through the second hole;
- inserting the straight copper pipe containing the final tube through the first threaded hole such that it is engaged by the through tube;
- pulling the through tube outwards, drawing the final tube outwards through the second hole;
- pulling the copper pipe out through the first hole, taking care not to remove the tube it housed;
- connecting the end of this tube to the end of the Teflon tube by means of a straight connector;
- placing a protective spring around said connector;
- placing a coupling in the thread, turning the whole assembly to tighten it;
- cutting the Teflon tube, leaving an end projecting out of the first hole;
- placing a washer, a connector and a steel nipple in the second hole;
- turning the spring to abut against the connector;
- tightening the coupling against the axle;
- connecting the pipe to the connector; and
- coupling the inner end of the shaft of the rotary pneumatic coupling by screwing it into the first hole.

19. (Original) A method according to claim 15 for arranging an air duct inside a hollow-end half-axle, comprising the steps of:

- making a first hole in the rear portion and in the middle of the axle using a magnetic drilling machine;
- passing a long tube from end to end inside the axle;
- inserting an unthreaded end of a Teflon tube inside the long tube;

- screwing the short tube threaded end into the Teflon tube;
- pushing this assembly inwards such that the connector's threaded orifice is directed towards the hole drilled in the axle;
- inserting a stem through the latter hole;
- screwing said stem into the connector orifice;
- placing a straight connector in the stem;
- manually screwing the straight connector into the internal connector;
- removing the stem and tightening a lock nut until the internal connector is secured against the axle inner wall;
- cutting the Teflon tube, leaving an end projecting out of the first hole in the axle end;
- protecting the Teflon tube with helical tape;
- connecting the coupling and inserting the whole assembly to abut against the plug;
- drilling the plug with a drill bit, using the two orifices provided in the coupling as a guide;
- riveting the coupling with the two orifices;
- connecting the pipe to the connector; and
- coupling the inner end of the shaft of a rotary pneumatic coupling by screwing it into the first hole.

20. (Original) A method according to claim 15 for arranging an air duct inside a half-axle having a hollow-end closed by an internal reinforcement, comprising the steps of:

- placing a rivet with a first thread in the end plug and riveting it ;
- making a second thread in the rear portion of the axle;
- protecting a Teflon tube with a hexagonal tube in the axle solid portion;
- passing a tube, which will be the air duct inside the axle, inside a straight copper pipe;
- placing a through tube through the second hole;
- inserting the straight copper pipe containing the final tube through the first threaded hole such that it is engaged by the through tube;
- pulling the through tube outwards, drawing the final tube outwards through the second hole;

- pulling the copper pipe out through the first hole, taking care not to remove the tube it housed;
- joining this tube end to the Teflon tube end by means of a straight connector;
- placing a protective spring around this connector;
- placing a coupling in the thread, by turning the whole assembly to tighten it;
- cutting the Teflon tube, leaving an end projecting out of the first hole;
- placing a washer, a connector and a steel nipple in the second hole;
- turning the spring to abut against the connector;
- tightening the coupling against the axle;
- connecting the pipe to the connector; and
- coupling the inner end of the shaft of a rotary pneumatic coupling by screwing it into the first hole.

21. (Original) A method for detecting a defective bearing in a wheel having a rotary pneumatic coupling according to claim 5, comprising detecting a pressurized air leak through said vent port as a any of result of wear, breakage and/or failure of bearings mounting the wheel on the vehicle axle, caused by a substantial axial shift of said axle in the inward direction.